

WHAT IS CLAIMED IS:

1. A solution casting process comprising steps of:  
casting dope including polymer and solvent on a support in forming bead of said dope by use of a flow casting die, to form gel film;  
stripping said gel film from said support by use of a stripping roller, to obtain polymer film; and  
cooling a surface of said support at  $-10^{\circ}\text{C}$  or lower.
2. A solution casting process as defined in claim 1, wherein said support is constituted by a rotary drum;  
in said cooling step, anti-freezing heat medium is used and caused to flow in a flow path formed through said rotary drum.
3. A solution casting process as defined in claim 2, wherein said anti-freezing heat medium is coolant of at least one of a glycol type, a fluorine type, and an alcohol type.
4. A solution casting process as defined in claim 1, wherein said support is formed from material with low-temperature brittleness.
5. A solution casting process as defined in claim 4, wherein said material with said low-temperature brittleness comprises any one of SUS steel, SLA steel and STPL steel.
6. A solution casting process as defined in claim 1, further comprising a step of blowing anti-condensation gas over a bead back surface of said bead, to lower density of gaseous solvent gasified from said solvent on said gel film in a vicinity of a landing line where said bead is landed to said support, so as to suppress condensation of said gaseous solvent on said support.

7. A solution casting process as defined in claim 6, wherein a temperature of condensation of said gaseous solvent is set lower than a temperature of said support by at least 1°C.

5 8. A solution casting process as defined in claim 6, wherein said anti-condensation gas is nitrogen or helium.

9. A solution casting process as defined in claim 6, wherein said anti-condensation gas flows at a flow rate of 0.5-2 m/s.

10 10. A solution casting process as defined in claim 6, further comprising a step of blowing heating air over a standby region that is defined on said support without said gel film and between a landing line where said bead is landed to said support and a stripping line where said gel  
15 film is stripped from said support, for setting a temperature of said standby region higher than a temperature of condensation of vapor in atmosphere or said gaseous solvent.

11. A solution casting process as defined in claim  
20 10, wherein said heating air has a temperature of 50-100°C.

12. A solution casting process as defined in claim 10, further comprising a step of condensing and withdrawing said gaseous solvent at a predetermined temperature that is set lower than a surface temperature of said polymer film  
25 by at least 1°C.

13. A solution casting process as defined in claim 10, wherein said support is rotatable about a rotational shaft;

further comprising steps of:

30 cooling said support with coolant; and

blowing warming air over said rotational shaft or a vicinity thereof in said support, for setting a temperature of said rotational shaft higher than a temperature of condensation of said vapor or said gaseous solvent.

5        14. A solution casting process as defined in claim 13, wherein said stripping roller strips said gel film from said support at film stress of 450,000 Pa or more.

15        15. A solution casting process as defined in claim 13, wherein said support and said stripping roller satisfy a condition of:

$$1.001 \leq V1/V0 \leq 1.5$$

where V0 is a peripheral speed of said support, and V1 is a peripheral speed of said stripping roller.

15        16. A solution casting process as defined in claim 13, wherein said support and said stripping roller satisfy a condition of:

$$1 \text{ mm} \leq C1 \leq 100 \text{ mm}$$

where C1 is a clearance between said stripping roller and said support to strip said gel film.

20        17. A solution casting process as defined in claim 13, wherein a difference in surface energy between said support and said dope is  $3 \times 10^{-2}$  N/m or more.

18. A solution casting process comprising steps of:

25        casting dope including polymer and solvent on a support in forming bead of said dope by use of a flow casting die, to form gel film;

stripping said gel film from said support by use of a stripping roller, to obtain polymer film; and

30        blowing anti-condensation gas over a bead back surface of said bead, to lower density of gaseous solvent gasified

from said solvent on said gel film in a vicinity of a landing line where said bead is landed to said support, so as to set a temperature of condensation of said gaseous solvent lower than a temperature of said support by at least 1°C.

19. A solution casting process as defined in claim 18, wherein said anti-condensation gas is nitrogen or helium.

20. A solution casting process as defined in claim 18, wherein said anti-condensation gas flows at a flow rate of 0.5-2 m/s.

21. A solution casting process as defined in claim 20, wherein said anti-condensation gas has a temperature of 30-50°C.

22. A solution casting process comprising steps of:  
casting dope including polymer and solvent on a support in forming bead of said dope by use of a flow casting die, to form gel film;

stripping said gel film from said support by use of a stripping roller, to obtain polymer film; and

blowing heating air over a standby region that is defined on said support without said gel film and between a landing line where said bead is landed to said support and a stripping line where said gel film is stripped from said support, for setting a temperature of said standby region higher than a temperature of condensation of vapor in atmosphere or gaseous solvent gasified from said solvent on said gel film.

23. A solution casting process as defined in claim 22, wherein said heating air has a temperature of 50-100°C.

24. A solution casting process as defined in claim 22, further comprising a step of condensing and withdrawing said gaseous solvent at a predetermined temperature that is set lower than a surface temperature of said polymer film  
5 by at least 1°C.

25. A solution casting process comprising steps of:

casting dope including polymer and solvent on a support in forming bead of said dope by use of a flow casting die, to form gel film;

10 stripping said gel film from said support by use of a stripping roller, to obtain polymer film; and

condensing and withdrawing gaseous solvent from said solvent gasified on said gel film at a predetermined temperature that is set lower than a surface temperature of  
15 said polymer film by at least 1°C.

26. A solution casting process as defined in claim 25, wherein said support is rotatable about a rotational shaft;

further comprising steps of:

20 cooling said support with coolant; and

blowing warming air over said rotational shaft or a vicinity thereof in said support, for setting a temperature of said rotational shaft higher than a temperature of condensation of vapor in atmosphere or gaseous solvent  
25 gasified from said solvent on said gel film.

27. A solution casting process comprising steps of:

casting dope including polymer and solvent on a rotatable support in forming bead of said dope by use of a flow casting die, to form gel film;

stripping said gel film from said support by use of a stripping roller, to obtain polymer film;

cooling said support with coolant; and

blowing warming air over a rotational shaft of said  
5 support or a vicinity thereof in said support, for setting  
a temperature of said rotational shaft higher than a  
temperature of condensation of vapor in atmosphere or  
gaseous solvent gasified from said solvent on said gel  
film.

10 28. A solution casting process as defined in claim  
27, wherein said warming air has a temperature of 20-30°C.